

## Sudden Infant Death Syndrome (SIDS) and Vaccination



**At a glance:** The age at which infants begin their primary course of vaccinations (2 to 4 months old) is also the peak age for the incidence of sudden infant death syndrome (SIDS). The similar timing of these two events has led some people to believe that the events might be related. However, recent studies have concluded that vaccinations are not a risk factor for SIDS or sudden unexpected death in infants<sup>1</sup>. The incidence of SIDS is declining in the United States due to public education campaigns regarding infant sleeping position, reduced exposure of infants to cigarette smoke and fewer potentially hazardous sleeping environments. Recent reports and studies, combined with the decrease in SIDS rate despite the increase in vaccinations, support the conclusion that routine childhood vaccinations do not contribute to SIDS.

### What is SIDS?

Sudden Infant Death Syndrome (SIDS) is the diagnosis given for the sudden death of an infant under one year of age that remains unexplained after a thorough case investigation (i.e., autopsy, death scene exam, review of health status prior to dying and family medical history). SIDS is the leading cause of death in infants between one month and one year of age. Most SIDS deaths occur when a baby is between one and four months of age.

### Who is at risk for SIDS?

- Babies who sleep on their stomachs
- Babies who sleep on soft bedding such as bean bag cushions, foam pads, and synthetic-filled adult pillows
- Babies born to mothers who smoke during pregnancy and after birth
- Babies born to mothers who are less than 20 years old at the time of their first pregnancy
- Babies born to mothers who had no or late prenatal care
- Babies who are premature or low birth weight

It is also important to note....

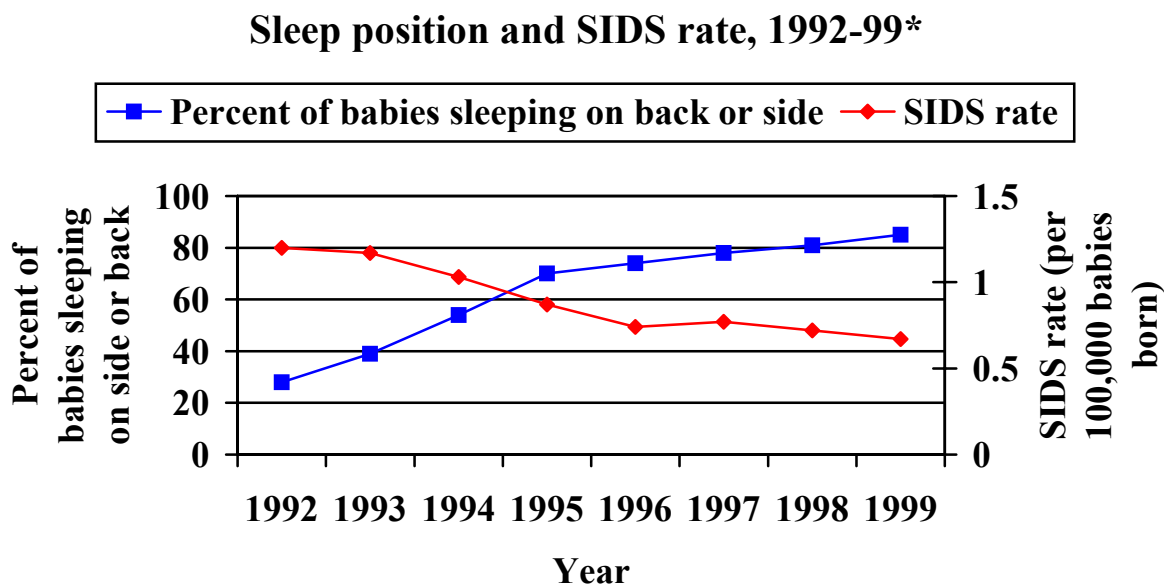
- Studies show that infants who are immunized are at decreased risk of SIDS<sup>2</sup>.
- The rate of SIDS in African American babies is 2.2-to-2.4 times that of white babies.
- The rate of SIDS in American Indian/Alaskan Native babies is about three times that of white babies.
- Boys are at greater risk for SIDS than girls.
- Babies are at higher risk during the cold winter months than the hot summer months.

### What causes SIDS?

The cause(s) of SIDS are not known. However, the "triple-risk" model<sup>3</sup> appears to be the most accepted description of the chain of events that may lead to SIDS. This model suggests that three factors or events lead to SIDS: First, an infant that appears normal and healthy has an underlying defect. This defect may be located in the brainstem, which is responsible for heart rate, respiratory controls and overall body regulatory mechanisms. Second, the infant, like all infants

under or around the age of 6 months, passes through a critical development period in which rapid changes in sleep and wake patterns, breathing, heart rate, blood pressure and temperature occur. Finally, other factors (like tummy sleeping, cigarette smoke exposure, and mild respiratory infections) tip the delicate balance causing SIDS. According to the triple-risk model, an infant will die of SIDS only if he or she possesses all three factors described above. For example, if an infant with an underlying defect is passing through the normal critical development period and is subjected to outside stressors (like tummy sleeping or cigarette smoke exposure), the infant is at high risk of dying from SIDS. Current programs to reduce the risk of SIDS have focused on these modifiable risk factors in an attempt to remove any additional stressors from a vulnerable infant. Because it is impossible to identify which infants are vulnerable, the risk reduction programs are targeted at every child.

The following graph shows that as the percentage of babies that are put to sleep on their back or side rather than their stomach increases, the rate of SIDS decreases.



\*Data from the National Institute of Child Health and Human Development (NICHD)

### **How do we know that some SIDS deaths are not due to vaccines?**

This issue has been studied for many years and several lines of evidence reassure us about the safety of vaccines.

- A study utilizing the Vaccine Safety Datalink (VSD) data, which included children who were under a health maintenance organization (HMO) health plan, found that there was no association between immunization and deaths in young children. The study investigated deaths in children one month to 7 years of age between 1991 and 1995. Data were analyzed by comparing vaccination histories for each vaccine during the week and month prior to the date of death for each child. Five hundred and seventeen deaths occurred between 1991-1995, most (59%) during the first year of life. Of these deaths, the results did not show an

association between immunizations and childhood deaths<sup>4</sup>.

- The Vaccine Adverse Event Reporting System (VAERS), established by the Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC), also monitors the safety of vaccines. VAERS provides a mechanism for the collection and analysis of adverse events associated with vaccines currently licensed in the United States. Adverse events are defined as health effects that occur after immunization that may or may not be related to the vaccine. VAERS data are continually monitored in order to detect previously unknown adverse events or increases in known adverse events.
- Studies that looked at the age distribution and seasonality of deaths reported to VAERS<sup>5</sup>, SIDS and VAERS reports following DTP vaccination<sup>6</sup>, and SIDS and VAERS reports following Hepatitis B vaccination<sup>7</sup> found no association between SIDS and vaccination.
- The FDA carefully investigates all deaths following vaccination that are reported to VAERS. Between 1990 and 1992 the FDA and the Institute of Medicine (IOM) reviewed 208 deaths reported to VAERS. Only one death was believed to have resulted from a vaccine: a 28-year-old woman who died from Guillain-Barre Syndrome (GBS) after tetanus vaccination. The IOM concluded that the vast majority of deaths reported to VAERS are coincidental and not causally related to vaccination<sup>8</sup>.

**For more information about SIDS and SIDS research, contact the National SIDS/ID Resource Center toll-free at 866-866-7437 (<http://www.sidscenter.org>). Additional information can also be obtained through the National Institute of Child Health and Human Development (NICHD <http://www.nichd.nih.gov/>) Clearinghouse at 1-800-370-2943. For more information about immunizations see the National Immunization Program website at <http://www.cdc.gov/nip>.**

## References

<sup>1</sup>Jonville-Bera AP, et al. Sudden unexpected death in infants under 3 months of age and vaccination status: a case-control study. *British Journal of Clinical Pharmacology* 2001; 51(3): 271-6.

<sup>2</sup>Fleming PJ, et al. The UK accelerated immunization programme and sudden unexpected death in infancy: case-control study. *British Medical Journal* 2001; 322: 822-825.

<sup>3</sup>Filiano JJ, Kinney HC. A perspective on neuropathologic findings in victims of sudden infant death syndrome: the triple-risk model. *Biology of the Neonate* 1994; 65(3-4): 194-7.

<sup>4</sup>Vadheim CM, et al. Lack of association between immunization and mortality in young children: a case-control study from the vaccine safety datalink project. Unpublished. Centers for Disease Control and Prevention 2000.

<sup>5</sup>Haber P, et al. Comparison of deaths reported to passive surveillance for vaccine adverse events

and SIDS in the U.S. Postmarketing Surveillance 1993; 7:205-206.

<sup>6</sup>Institute of Medicine. Howson CP, et al. eds. Adverse effects of pertussis and rubella vaccines. Washington, DC: National Academy Press; 1991.

<sup>7</sup>Niu T, et al. Neonatal deaths after hepatitis B vaccine. Arch Pediatr Adolesc Med 1999; 153:1279-82.

<sup>8</sup>Institute of Medicine. Stratton KR, et al. eds. Diphtheria-pertussis- tetanus (DPT) vaccine and chronic nervous system dysfunction: a new analysis. Washington, DC: National Academy Press; 1994.

<sup>9</sup>Simon PA, et al. Outbreak of pyogenic abscesses after diphtheria and tetanus toxoids and pertussis vaccination. Pediatr Infect Dis J 1993; 12: 368-71.

### **Additional Resources**

Carroll J, Siska E. SIDS: Counseling parents to reduce the risk. American Family Physician 1998; 57(7): 1566-72.

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World Health Organization. Routine vaccination and child survival, questions and answers, Department of Vaccines and Biologicals, WHO July 2001. <http://www.who.int/vaccines-diseases/safety/hotspot/routvaccine.shtml>.